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Siloxanes and silicones based on phosphorylated and aminated alkoxysilanes

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Abstract

© 2018 Nova Science Publishers, Inc. Organosilicon compounds attract the special interest due to growing demand for eco-friendly materials. The creation of new promising materials using polyfunctional siloxane/silicone frameworks is an intensively developing field of chemistry and materials science. A special place is occupied by siloxane structures that have thermal and mechanical stability, as well as low toxicity. It is possible to select a number of classes that open up new opportunities for synthesis a variety of organosilicon polymers: chlorosilanes, alkoxysilanes and hydrosilanes. The introduction of the polyfunctional fragments in the siloxane matrix is capable to improving their mechanical properties and changing their physico-chemical properties (solubility, self-association and selective complexation) will allow to obtain new materials with practically useful properties. For example, organophosphorus compounds are widely distributed in nature. They have found the application in agriculture, medicine and industry. Some organophosphorus compounds are used as pesticides, bactericides and fungicides. Aminophosphonic acids and their esters have a biological activity; act as herbicides, enzyme inhibitors, as well as antibacterial, antiviral and antitumor agents. The ability to form strong chelate complexes with aminophosphonic acid derivatives has the application in the extraction of gold ions from complex mixtures. The introduction of the 1-aminophosphonate fragment into the siloxane matrix can lead to an increase in the affinity for various biological objects, which will further open the possibility of developing a methodology for obtaining new materials with molecular recognition function. Therefore, the review considers the successes in the synthesis and functionalization of the alkoxysilanes by phosphoryl and amino groups. The main attention is paid to the introduction of the N-alkylamino groups and phosphorylation of the alkoxysilane derivatives. In addition, questions relating to the synthesis of aminophosphonates containing the alkoxysilyl moiety are discussed.

Keywords

Alkoxysilane derivatives, Amination, Phosphorylation, Synthesis

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